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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/469,308	12/22/1999	IK PYO HONG	K-150	4822

7590 07/16/2003

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EXAMINER	
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ART UNIT	PAPER NUMBER
2633	9

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/469,308	HONG, IK PYO	
	Examiner	Art Unit	
	Sherif R. Fahmy	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *6/12/2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1, 2, 4, 5, 6, 8, 9 and 11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 2, 4, 5, 6, 8, 9 and 11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 December 1999* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the following features must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Regarding claim 1, the following must be shown in the drawings:

"comparing, at the slave repeater, the detected modulated MODEM signal level with a reference level and obtaining a difference between the levels",

"adjusting a gain of an amplifier for the RF signal in the slave repeater".

Regarding claim 4,

"controlling the gain of the amplifier" must be shown.

Regarding claim 5, the following must be shown:

"separating the mixed signal into a second modulated MODEM signal and a second RF signal, and detecting the modulated MODEM signal level from the second modulated MODEM signal",

"comparing, at the slave repeater, the detected modulated MODEM signal level with a reference level and obtaining a difference between the levels",

"controlling a gain of an amplifier for the RF signal in the slave repeater", and

"amplifying the second RF signal according to the controlled gain".

Regarding claim 9, the following must be shown:

"separating the transmitted monitoring signal from the transmitted RF signal at the slave repeater",

"comparing, at the slave repeater, a level of the transmitted monitoring signal with the predetermined level", and

"adjusting a gain applied to the transmitted RF signal by using the comparison to calculate the gain adjustment."

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 6 is objected to because of the following informalities: "reporter" in line 4 of the claim should read "repeater" (as would be consistent with the specification and the rest of the claim language". Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fillot.

Regarding claim 9, Fillot teaches combining a monitoring signal of a predetermined level with an RF signal ("radio" -RF- is one of the types of transmission systems the reference is concerned with –see abstract). (See for example col. 3- lines 46-48). It is noted that a "pilot signal" as disclosed in the reference is *by definition* a monitoring signal mixed with a data signal. Additionally, it is noted that extraction of a pilot signal using a band-pass filter, as disclosed in the reference means that the pilot signal is *necessarily* mixed with a data signal. Furthermore,

since the pilot signal is continuously transmitted in the line (see for example col. 3- lines 20-25), and since the system disclosed by Fillot is a *communication* system, which necessarily communicates data, then also for this reason, the pilot signal is *necessarily* mixed with a data signal. Accordingly, Fillot fully discloses combining a monitoring signal of a predetermined level with an RF signal.

Fillot further discloses transmitting the combined monitoring and RF signals to a slave repeater (see for example col. 3- lines 20-25); this is *necessarily* true as evidenced by the fact that the gain adjustment operation occurs at an "intermediate amplification circuit" disclosed by Fillot. For the pilot signal and the data signal to be processed at the slave repeater, they have to arrive there, and accordingly, are necessarily transmitted to that location.

Fillot also teaches separating the transmitted monitoring signal from the transmitted RF signal at the slave repeater (see for example col. 3- lines 46-49). This is *necessarily* true due to the fact that a band-pass filter is necessary to separate the pilot signal from *another* signal. Additionally, it is clear in the disclosure that a data signal is also transmitted to the "intermediate amplification circuit", since the purpose of the system is to communicate data and since regular gain adjustment is required (see for example col. 3- lines 25-31), and also as discussed above. This is because the pilot signal is only used to adjust the gain. Therefore, if not inherent to the disclosure, it would have been obvious to one having ordinary skill in the art, at the time the present invention was made, to separate at the slave repeaters the transmitted monitoring signal from the transmitted data signal, since the two are necessarily transmitted simultaneously. Fillot teaches processing the "pilot signal" separately. Therefore in order to process either of the RF signal or the monitoring signal separately, they must first be separated. If this is not inherent to

the teaching, it would have been obvious to one having ordinary skill in the art, as it is clearly suggested by the teaching.

Fillot teaches comparing, at the slave repeater (col. 3- lines 25-27), a level of the transmitted monitoring signal with a predetermined level, However, Fillot does not specifically disclose comparing at the slave repeater, a level of the transmitted monitoring signal with *the predetermined level* (that is of the monitoring signal). However, Fillot teaches that the comparison (and gain adjustment), are used to compensate for line losses. Therefore, one having ordinary skill in the art would have readily recognized that the predetermined level (of the monitoring signal), in comparison to the current level of the modulated MODEM signal is a useful indicator of the amount of attenuation the modulated MODEM signal would have experienced. Accordingly, at the time the present invention was made, it would have been obvious to one having ordinary skill in the art to compare a level of the transmitted monitoring signal with the predetermined level. One having ordinary skill in the art would have been motivated to do this in order properly to determine the gain adjustment necessary based on the attenuation of the line as determined from the attenuation of the pilot signal.

The monitoring signal of a predetermined level, in Fillot (col. 3- lines 46-48) comprises a modulated MODEM signal.

Finally, Fillot discloses adjusting a gain applied to the transmitted RF signal by using the comparison to calculate the gain adjustment (see for example col. 3- lines 46-56).

4. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fillot as applied to claim 9 above, and further in view of Okubo. Fillot does not specifically teach that the transmitting step comprises: converting the combined monitoring and RF signals into an optical

signal; and transmitting the optical signal to the slave repeater via an optical fiber. However, Fillot does suggest that the techniques discussed in the reference are relevant to transmission over optical fibers (see for example abstract). Okubo teaches the specific features missing from the Fillot reference (see for example fig. 1- elements 32 and 5). At the time the present invention was made, it would have been obvious to one having ordinary skill in the art to convert the combined monitoring and RF signals into an optical signal; and to transmit the optical signal to the slave repeater via an optical fiber. One having ordinary skill in the art would have been motivated to do this because the use of optical fibers to transmit any signal (having been converted to an optical signal) over long distances is notorious in the art of digital/electrical/radio communications (see for example Okubo col. 1- lines 38-53). Transmitting over long distances is desired for instance in an application where radio waves are meant to reach a silent zone (a place that RF signals *do not* reach over the atmosphere) (see for example Okubo col. 1- lines 38-53).

5. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fillot in view of Okubo.

Regarding claim 1, Fillot teaches a method for a gain control of a fiberoptic repeating system comprising:

Mixing from a master repeater a modulated MODEM signal of a predetermined level with a RF signal and transmitting the mixed signal ("radio" -RF- is one of the types of transmission systems the reference is concerned with –see abstract). (See for example col. 3- lines 46-48); It is noted that a "pilot signal" as disclosed in the reference is *by definition* a modulated MODEM signal mixed with a data signal. Additionally, it is noted that extraction of a pilot signal using a band-pass filter, as disclosed in the reference means that the pilot signal is

necessarily mixed with a data signal. Furthermore, since the pilot signal is continuously transmitted in the line (see for example col. 3- lines 20-25), and since the system disclosed by Fillot is a *communication* system, which necessarily communicates data, then also for this reason, the pilot signal is *necessarily* mixed with a data signal. Accordingly, Fillot fully discloses combining a modulated MODEM signal of a predetermined level with an RF signal.

Fillot does not specifically teach transmitting the mixed signal through an optical cable. However, Fillot does contemplate systems that use optical fiber links, as well as systems that use radio links (for example, see abstract). Furthermore, Okubo specifically teaches transmitting an RF signal over an optical cable from a master repeater to a slave repeater (see for example, 3, 34, 5, 42, 4 in fig. 1). Okubo teaches that such repeaters are used in locations where no radio waves (RF) can be received (see for example, col. 1- lines 37). Thus an optical fiber offers the advantages of being able to reach such areas. Furthermore, optical fibers as transmission media are notorious for handling very high bandwidths, over very long distances. Accordingly, at the time the present invention was made, it would have been obvious to one having ordinary skill in the art to transmit the mixed signal through an optical cable, in order to realize all the said advantages.

Fillot further discloses detecting at a slave repeater a modulated MODEM signal level from the mixed signal transmitted by the master repeater (see for example col. 3- lines 46-49);

Fillot also teaches comparing, at the slave repeater, the detected modulated MODEM signal level with a reference level and obtaining a difference between the levels (see for example col. 3- lines 46-56),

Fillot discloses adjusting a gain of an amplifier for the RF signal in the slave repeater by using the obtained difference to calculate the gain adjustment (see for example col. 3- lines 46-56).

In this description in Fillot, it is not specifically taught that the reference level is a predetermined level unless the master repeater transmits a control signal of a base station; however, Fillot also teaches controlling the gain of the amplifier in the slave repeaters by a direct control signal from a monitoring station, and not by comparing the level of the pilot signal with a predetermined level (column 10- lines 49-57). As shown hereinabove, Fillot describes at least a repeater that compares a pilot signal with a predetermined value to set the gain of an amplifier (see rejection of claim 1), and a repeater that sets the gain according to direct instructions from a monitoring unit (column 10- lines 49-57). It is well known in the art that a repeater according to Fillot may be easily constructed with the capability to perform at least both of these tasks (one at a time), and may be easily configured to perform one particular task always unless instructed to perform another task, for instance by using interrupt-handling in the repeater circuitry. It would have been obvious to one having ordinary skill in the art at the time the present invention was made to control the repeater of the modified system of Okubo and Fillot described in the rejection of claim 1 using a circuit that compares the pilot signal with the predetermined level unless the master repeater transmits a control signal from the base station to the slave repeater. One of ordinary skill in the art would have been motivated to do this in order to adjust the gain in the slave repeaters to account for changes at the transmission end (the base station and master repeater), such as a weakened or intensified RF signal transmitted to the master repeater from the base station due to changes in weather conditions.

6. Regarding claim 2, Fillot teaches that the modulated modem signal is detected in a controller of the slave repeater (column 1, lines 46-48).

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fillot in view of Okubo as applied to claim 1 above, and further in view of Kobayashi et al. The modified system of Fillot and Okubo, forming the basis for the rejection of claim 1 above includes using the difference arising out of the comparison to modify the gain of the amplifier (Fillot, column 3- lines 46-53). The system does not specify increasing the level of the RF signal by the obtained difference. Kobayashi teaches a communication system comprising a plurality of modems connected to a transmission line, where a head end sends a pilot signal to the modems and each modem compares the signal level thereof to a predetermined value, obtains the difference and increases its amplification gain to increase the RF level by the obtained difference (column 5- line 21 to column 6- line 13, including equations). It would have been obvious to one having ordinary skill in the art at the time the present invention was made to increase the RF level by said difference, in the modified system of Okubo and Fillot that formed the basis for the rejection of claim 1. One of ordinary skill in the art would have been motivated to do so if a certain minimum RF level is desired to be transmitted from the slave repeater's antenna to whatever terminal station.

8. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fillot in view of Okubo.

Regarding claim 5, Fillot teaches a method for gain control of a fiberoptic repeating system comprising:

Mixing a first modulated MODEM signal of a predetermined level with a first RF signal and transmitting the mixed signal to a slave repeater ("radio" -RF- is one of the types of transmission systems the reference is concerned with –see abstract). (See for example col. 3- lines 20-25 and col. 3- lines 46-48). It is noted that a "pilot signal" as disclosed in the reference is *by definition* a modulated MODEM signal mixed with a data signal. Additionally, it is noted that extraction of a pilot signal using a band-pass filter, as disclosed in the reference means that the pilot signal is *necessarily* mixed with a data signal. Furthermore, since the pilot signal is continuously transmitted in the line (see for example col. 3- lines 20-25), and since the system disclosed by Fillot is a *communication* system, which necessarily communicates data, then also for this reason, the pilot signal is *necessarily* mixed with a data signal. Accordingly, Fillot fully discloses combining (mixing) a modulated MODEM signal of a predetermined level with an RF signal.

Fillot does not specifically teach transmitting the mixed signal through an optical cable. However, Fillot does contemplate systems that use optical fiber links, as well as systems that use radio links (for example, see abstract). Furthermore, Okubo specifically teaches transmitting an RF signal over an optical cable from a master repeater to a slave repeater (see for example, 3, 34, 5, 42, 4 in fig. 1). Okubo teaches that such repeaters are used in locations where no radio waves (RF) can be received (see for example, col. 1- lines 37). Thus an optical fiber offers the advantages of being able to reach such areas. Furthermore, optical fibers as transmission media are notorious for handling very high bandwidths, over very long distances. Accordingly, at the time the present invention was made, it would have been obvious to one having ordinary skill in

the art to transmit the mixed signal through an optical cable, in order to realize all the said advantages.

Fillot further discloses receiving and separating the mixed signal into a second modulated MODEM signal and a second RF signal, and detecting a modulated MODEM signal level from the second modulated MODEM signal (see for example col. 3- lines 46-49);

Fillot also teaches comparing, at the slave repeater, the detected modulated MODEM signal level with a reference level and obtaining a difference between the levels (see for example col. 3- lines 46-56).

Fillot does not specifically teach that the reference level is the predetermined level (of the modulated MODEM signal), unless the master repeater transmits a control signal of a base station); Fillot does teach comparing, at the slave repeater (col. 3- lines 25-27), a level of the transmitted monitoring signal with a predetermined level, However, Fillot does not specifically disclose comparing at the slave repeater, a level of the transmitted monitoring signal with *the predetermined level* (that is of the monitoring signal). However, Fillot teaches that the comparison (and gain adjustment), are used to compensate for line losses. Therefore, one having ordinary skill in the art would have readily recognized that the predetermined level (of the monitoring signal), in comparison to the current level of the modulated MODEM signal is a useful indicator of the amount of attenuation the modulated MODEM signal would have undergone. Accordingly, at the time the present invention was made, it would have been obvious to one having ordinary skill in the art to compare a level of the transmitted monitoring signal with the predetermined level. One having ordinary skill in the art would have been motivated to

do this in order properly to determine the gain adjustment necessary based on the attenuation of the line as determined from the attenuation of the pilot signal.

In this modified teaching, it is not specifically taught that the reference level is the predetermined level unless the master repeater transmits a control signal of a base station; however, Fillot also teaches controlling the gain of the amplifier in the slave repeaters by a direct control signal from a monitoring station, and not by comparing the level of the pilot signal with a predetermined level (column 10- lines 49-57). As shown hereinabove, Fillot describes at least a repeater that compares a pilot signal with a predetermined value to set the gain of an amplifier (see rejection of claim 1), and a repeater that sets the gain according to direct instructions from a monitoring unit (column 10- lines 49-57). It is well known in the art that a repeater according to Fillot may be easily constructed with the capability to perform at least both of these tasks (one at a time), and may be easily configured to perform one particular task always unless instructed to perform another task, for instance by using interrupt-handling in the repeater circuitry. It would have been obvious to one having ordinary skill in the art at the time the present invention was made to control the repeater of the modified system of Okubo and Fillot described in the rejection of claim 1, and further comprising a base station, with a circuit that compares the pilot signal with the predetermined level unless the master repeater transmits a control signal from the base station to the slave repeater. One of ordinary skill in the art would have been motivated to do this in order to adjust the gain in the slave repeaters to account for changes at the transmission end (the base station and master repeater), such as a weakened or intensified RF signal transmitted to the master repeater from the base station due to changes in weather conditions.

Fillot discloses adjusting a gain of an amplifier for the RF signal in the slave repeater by using the obtained difference to calculate the gain adjustment, and amplifying the second RF signal according to the controlled gain and transmitting the second amplified RF signal to a terminal (see for example col. 3- lines 46-56). Transmitting to a terminal is inherent to the teaching of a communication system.

9. Regarding claim 6, Fillot teaches that the modulated modem signal is detected in a controller of the slave repeater (column 1, lines 46-48).

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fillot in view of Okubo as applied to claim 5 above, and further in view of Kobayashi et al. The modified system of Fillot and Okubo, forming the basis for the rejection of claim 5 above includes using the difference arising out of the comparison to modify the gain of the amplifier (Fillot, column 3- lines 46-53). The system does not specify increasing the level of the RF signal by the obtained difference. Kobayashi teaches a communication system comprising a plurality of modems connected to a transmission line, where a head end sends a pilot signal to the modems and each modem compares the signal level thereof to a predetermined value, obtains the difference and increases its amplification gain to increase the RF level by the obtained difference (column 5- line 21 to column 6- line 13, including equations). It would have been obvious to one having ordinary skill in the art at the time the present invention was made to increase the RF level by said difference, in the modified system of Okubo and Fillot that formed the basis for the rejection of claim 1. One of ordinary skill in the art would have been motivated to do so if a certain minimum RF level is desired to be transmitted from the slave repeater's antenna to whatever terminal station.

11. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okubo in view of Fillot.

Regarding claim 1, Okubo teaches a fiber-optic repeating system (abstract, figure 1), consisting of a master repeater (3 in figure 1), a slave repeater (4 in figure 1) and optical fibers connecting the master repeater to the slave repeater (5 in figure 1 and column 1- lines 61-64). The master repeater processes an RF signal, and transmits it to the slave repeater through the optical fiber (column 1, lines 42-47). Okubo teaches a method for gain control of the fiber-optic repeating system (Column 7- lines 12-18, and column 6, lines 49-50), the method comprising comparing the level of a signal transmitted from the master repeater to a predetermined level in the slave repeater, obtaining a difference, and controlling the gain of an amplifier for the RF signal in the slave repeater based on the difference (45 and 46 in figure 1, column 7- lines 12-18). Okubo does not teach mixing a modulated modem signal of a predetermined level with the RF signal in the master repeater, detecting the modulated modem signal in the slave repeater and comparing its level in the slave repeater with said predetermined level to obtain said difference.

Fillot teaches detecting a modulated modem signal (pilot signal) in a repeater circuit, one of the intermediate amplification circuits mentioned in the abstract, using a bandpass filter (column 3, lines 46-48); accordingly, the signal inherently had been mixed with another transmitted signal, so as to require extraction using a bandpass filter. Fillot also explicitly teaches mixing of pilot signals transmitted to fiber-optic repeaters (column 7, lines 35-38) with a data signal (column 7, lines 24-28, and column 8- lines 7-12). The pilot signal is compared to a predetermined level, and the obtained difference is used to vary the gain of the repeater's

amplifier (column 3, lines 46-53). It would have been obvious to one having ordinary skill in the art, at the time the present invention was made to mix Fillot's pilot signal with the RF signal in Okubo's master repeater, to transmit it to the slave repeater of Okubo, to detect it in the slave repeater and to compare the level of the pilot signal with a predetermined value, using the obtained difference to vary the amplifier gain in the slave repeater. One of ordinary skill in the art would have been motivated to do this in order to adjust the amplifier's gain based on the attenuation due to the fiber medium, if this attenuation is all that needs to be taken into account for adjusting the gain, since it is well known in the art that the initial RF signal may vary significantly in level aside from variations due to subsequent attenuation in the fiber medium, whereas a pilot signal is generated at a constant level.

Though the combined teaching does not specifically prescribe that the reference level is a predetermined level unless the master repeater transmits a control signal of a base station, Fillot also teaches controlling the gain of the amplifier in the slave repeaters by a direct control signal from a monitoring station, and not by comparing the level of the pilot signal with a predetermined level (column 10- lines 49-57). As shown hereinabove, Fillot describes at least a repeater that compares a pilot signal with a predetermined value to set the gain of an amplifier (see rejection of claim 1), and a repeater that sets the gain according to direct instructions from a monitoring unit (column 10- lines 49-57). It is well known in the art that a repeater according to Fillot may be easily constructed with the capability to perform at least both of these tasks (one at a time), and may be easily configured to perform one particular task always unless instructed to perform another task, for instance by using interrupt-handling in the repeater circuitry. It would have been obvious to one having ordinary skill in the art at the time the present invention was

made to control the repeater of the modified system of Okubo and Fillot described in the rejection of claim 1, and further comprising a base station, with a circuit that compares the pilot signal with the predetermined level unless the master repeater transmits a control signal from the base station to the slave repeater. One of ordinary skill in the art would have been motivated to do this in order to adjust the gain in the slave repeaters to account for changes at the transmission end (the base station and master repeater), such as a weakened or intensified RF signal transmitted to the master repeater from the base station due to changes in weather conditions.

12. Regarding claim 2, Fillot teaches that the modulated modem signal is detected in a controller of the slave repeater (column 1, lines 46-48).

13. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okubo and Fillot as applied to claim 1 above, and further in view of Kobayashi et al. The modified system of Okubo and Fillot, forming the basis for the rejection of claim 1 above includes using the difference arising out of the comparison to modify the gain of the amplifier (Fillot, column 3- lines 46-53). The system does not specify increasing the level of the RF signal by the obtained difference. Kobayashi teaches a communication system comprising a plurality of modems connected to a transmission line, where a head end sends a pilot signal to the modems and each modem compares the signal level thereof to a predetermined value, obtains the difference and increases its amplification gain to increase the RF level by the obtained difference (column 5- line 21 to column 6- line 13, including equations). It would have been obvious to one having ordinary skill in the art at the time the present invention was made to increase the RF level by said difference, in the modified system of Okubo and Fillot that formed the basis for the rejection of claim 1. One of ordinary skill in the art would have been motivated to do so if a certain

minimum RF level is desired to be transmitted from the slave repeater's antenna to whatever terminal station.

14. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okubo in view of Fillot.

Regarding claim 5, Okubo teaches a fiber-optic repeating system (abstract, figure 1) and method comprising transmitting from a base station (1 in figure 4) a first RF signal (figure 4, arrow pointing from base station to the master device 3), amplifying the first RF signal by a constant level through an amplifier of a master repeater (figure 1- constant gain amplifier shown between the duplexer in 31 and E/O stage 32 of master repeater 3), the system also comprising a slave repeater (4 in figure 1) and optical fibers connecting the master repeater to the slave repeater (5 in figure 1 and column 1- lines 61-64). According to Okubo's method, the master repeater transmits the first amplified RF signal to the slave repeater through the optical fiber (column 1, lines 42-47). Okubo teaches detecting a second RF signal in the slave repeater (see 42 in figure 2). Okubo also teaches comparing a detected signal level of a signal transmitted from the master repeater to a predetermined level in the slave repeater, obtaining a difference, and controlling the gain of an amplifier for the RF signal in the slave repeater based on the difference (45 and 46 in figure 1, column- lines 12-18). Okubo also teaches amplifying the second RF signal according to the controlled gain (46 in figure 2), and transmitting the amplified second RF signal to a terminal (see arrow pointing away from the antenna of slave device 6-1 in figure 4, and column 1- lines 15-17). Okubo does not teach mixing a modulated modem signal of a predetermined level with the first RF signal in the master repeater, separating the mixed signal in the slave repeater into a second modulated modem signal and a second RF signal, detecting the

level of the second modulated modem signal, and comparing its level in the slave repeater with said predetermined level to obtain said difference.

Fillot teaches detecting a modulated modem signal (pilot signal) in one of multiple repeater circuits, the intermediate amplification circuits mentioned in the abstract, using a bandpass filter (column 3, lines 46-48); accordingly, the signal inherently had been mixed with another transmitted signal, so as to require extraction using a bandpass filter. Fillot also explicitly teaches mixing of pilot signals transmitted to fiber-optic repeaters (column 7, lines 35-38) with a data signal (column 7, lines 24-28, and column 8- lines 7-12). The pilot signal is compared to a predetermined level, and the obtained difference is used to vary the gain of the repeater's amplifier (column 3, lines 46-53). It would have been obvious to one having ordinary skill in the art, at the time the present invention was made to mix Fillot's pilot signal with the RF signal in Okubo's master repeater, to transmit it to the slave repeater of Okubo, to separate the pilot signal from the RF data signal, into a second pilot signal, to detect its level in the slave repeater and to compare the level of the second pilot signal with a predetermined value, using the obtained difference to vary the amplifier gain in the slave repeater, in order to amplify the second RF signal to be transmitted. One of ordinary skill in the art would have been motivated to do this in order to adjust the amplifier's gain based on the attenuation due to the fiber medium, if this attenuation is all that needs to be taken into account for adjusting the gain, since it is well known in the art that the initial RF signal may vary significantly in level aside from variations due to subsequent attenuation in the fiber medium, whereas a pilot signal is generated at a constant level.

This combined teaching does not specify that the reference level the pilot tone is compared with is the predetermined level (of the modulated MODEM signal), unless the master repeater transmits a control signal of a base station); Fillot teach comparing, at the slave repeater (col. 3- lines 25-27), a level of the transmitted monitoring signal with a predetermined level, However, Fillot does not specifically disclose comparing at the slave repeater, a level of the transmitted monitoring signal with *the predetermined level* (that is of the monitoring signal). However, Fillot teaches that the comparison (and gain adjustment), are used to compensate for line losses. Therefore, one having ordinary skill in the art would have readily recognized that the predetermined level (of the monitoring signal), in comparison to the current level of the modulated MODEM signal is a useful indicator of the amount of attenuation the modulated MODEM signal would have experienced. Accordingly, at the time the present invention was made, it would have been obvious to one having ordinary skill in the art to compare a level of the transmitted monitoring signal with the predetermined level. One having ordinary skill in the art would have been motivated to do this in order properly to determine the gain adjustment necessary based on the attenuation of the line as determined from the attenuation of the pilot signal.

In this modified teaching, it is not specifically taught that the reference level is the predetermined level unless the master repeater transmits a control signal of a base station; however, Fillot also teaches controlling the gain of the amplifier in the slave repeaters by a direct control signal from a monitoring station, and not by comparing the level of the pilot signal with a predetermined level (column 10- lines 49-57). As shown hereinabove, Fillot describes at least a repeater that compares a pilot signal with a predetermined value to set the gain of an amplifier

(see rejection of claim 1), and a repeater that sets the gain according to direct instructions from a monitoring unit (column 10- lines 49-57). It is well known in the art that a repeater according to Fillot may be easily constructed with the capability to perform at least both of these tasks (one at a time), and may be easily configured to perform one particular task always unless instructed to perform another task, for instance by using interrupt-handling in the repeater circuitry. It would have been obvious to one having ordinary skill in the art at the time the present invention was made to control the repeater of the modified system of Okubo and Fillot described in the rejection of claim 1, and further comprising a base station, with a circuit that compares the pilot signal with the predetermined level unless the master repeater transmits a control signal from the base station to the slave repeater. One of ordinary skill in the art would have been motivated to do this in order to adjust the gain in the slave repeaters to account for changes at the transmission end (the base station and master repeater), such as a weakened or intensified RF signal transmitted to the master repeater from the base station due to changes in weather conditions.

15. Regarding claim 6, Fillot teaches that the modulated modem signal is detected in a controller of the slave repeater (column 1, lines 46-48).

16. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okubo and Fillot as applied to claim 5 above, and further in view of Kobayashi et al. The modified system of Okubo and Fillot, forming the basis for the rejection of claim 5 above includes using the difference arising out of the comparison to modify the gain of the amplifier (Fillot, column 3- lines 46-53). The system does not specify increasing the level of the RF signal by the obtained difference. Kobayashi teaches a communication system comprising a plurality of modems connected to a transmission line, where a head end sends a pilot signal to the modems and each

modem compares the signal level thereof to a predetermined value, obtains the difference and increases its amplification gain to increase the RF level by the obtained difference (column 5- line 21 to column 6- line 13, including equations). It would have been obvious to one having ordinary skill in the art at the time the present invention was made to increase the RF level by said difference, in the modified system of Okubo and Fillot that formed the basis for the rejection of claim 1. One of ordinary skill in the art would have been motivated to do so if a certain minimum RF level is desired to be transmitted from the slave repeater's antenna to whatever terminal station.

Response to Arguments

17. Applicant's arguments with respect to claims 1, 2, 4, 5, 6, 8, 9 and 11 have been considered but are moot in view of the new ground(s) of rejection.

18. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sherif R. Fahmy whose telephone number is 703-305-8088. The examiner can normally be reached on 8:30AM-6:00PM(Mo-Th) 8:30AM-5:00PM(2nd & 4th Fr).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone numbers for the

organization where this application or proceeding is assigned are 703-305-3988 for regular communications and 703-305-3988 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4800.

SRF
July 1, 2003

JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600